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10/697,010	10/31/2003	Ramon Vega	20020963-1	8251

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EXAMINER	
ZHU, RICHARD Z	

ART UNIT	PAPER NUMBER
2625	

NOTIFICATION DATE	DELIVERY MODE
01/14/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/697,010	VEGA ET AL.	
	Examiner	Art Unit	
	RICHARD Z. ZHU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,6-12 and 16-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 6-12, and 16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement

1. Acknowledgement is made of applicant's amendment made on 11/06/2008. Applicant's submission filed has been entered and made of record.

Response to Applicant's Arguments

2. Since the applicant didn't fully adopt examiner's suggestion, the limitation "wherein each element newly made available to the group is initially made available for use less frequently than the existing element(s) in a subsequent pass of printing" is not understood by the examiner as previously presented limitation but rather newly amended limitation.

3. The examiner is vacating previous grounds of rejection in favor of new grounds of rejection in order to expedite prosecution and better convey the office's (USPTO) position.

4. With respect to previously presented limitation of Claim 4 that is now incorporated into Claim 1, the examiner will clarify further in the instant office action. See Rejection of Claim 1 below. Furthermore, applicant's question pertaining to ***Girones*** will be answered in the relevant portion of what is now the rejection of Claim 8.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 6-8, 10-14, 16, and 18-20 are rejected under 35 USC 103(a) as being unpatentable over ***Maruyama et al. (US 6871934 B2)*** in view of ***Fuse. (US 5673071 A)***.

Regarding Claim 1, ***Maruyama*** discloses a method of operating a printer of the kind comprising an array of dot printing elements extending in a first direction relative to a page to be printed and which prints at least a part of the page during relative movement between the array and the page in a second direction at an angle to the first direction (**Col 4, Rows 45-65, a printhead comprising a plurality of nozzles moved in the main scanning direction and the paper medium being moved relative to the nozzles in the sub-scanning direction**), the array comprising a plurality of groups of elements with redundancy among the elements of the group (**Col 5, Rows 16-35, different nozzles are used to print different dots**), the method comprising, in respect of at least one of said groups, initially commencing printing using a subset of the elements in the group (**Col 5, Rows 30-35, keeping a subset of nozzles out of use when printing is first commenced**) and, during the course of printing, increasing the number of elements available to print in the group (**Fig 4, and see Col 5, Rows 58 – Col 6, Row 20**);

wherein each element newly made available to the group is initially made available for use less frequently than the existing element(s) (**Fig 4, for example Scan Pass N+I, nozzles 1-4 had already been used 5 times when nozzles 5-7 are used only once**);

wherein the number of elements in the group available for print is increased as a function of the number of firing pulses sent to the elements of the group (**Col 5, Rows 1-10 in view of Col 10, Rows 25-35, see also Figs 4 and 8. A pulse P1 is applied a nozzle to eject ink from the nozzle and P2 is applied to make a nozzle available for printing. In Fig 4, nozzles with P1 applied are marked with "o" and nozzles with P2 applied are marked with "x". As one can observed from Fig 4, the number of elements in the printhead available for printing increases from pass N-3 to N+5 as more and more pulses P1 and P2 are applied to respective Nozzles 1-16. For example, in N-3, only four nozzles 1-4 are available since only four P1 pulses are applied. But in pass N+5, nozzles 1-16 are available for printing since 16 P1 pulses are applied. This reads on the claimed limitation**).

Masuyama does not teach wherein each element newly made available to the group is use less frequently than the existing elements in a subsequent pass of printing.

Fuse discloses a method for preparing a printhead for printing (**Abstract, a preparatory head drive method**) wherein each element in a printhead newly made available for printing is use less frequently or in a drive frequency lower or less than a normal print head drive frequency in subsequent pass of printing (**Col 12, Rows 20-38, preparatory discharge of ink is driven at a frequency that is lower than the normal drive frequency for printing**).

Fuse suggests a method for preparing nozzles initially left unused for a period of time for normal printing conditions (**Col 3, Rows 22-28**), therefore, it would've been obvious to

one of ordinary skill in the art at the time of the invention to modify the printhead of *Maruyama* to use element or nozzle newly made available to the group less frequently, or to set head drive frequency of elements newly made available to be lower than the normal print head drive frequency of existing elements whereas the motivation would've been to prepare printhead for printing with reduced ink and preparation time consumption (***Fuse*, Col 3, Rows 20-40**).

Regarding Claim 2, ***Maruyama*** discloses wherein each redundant group is arranged to print a respective row of dots in the second direction (**Col 5, Rows 15-35, multi-pass printing assigns a fraction of a the total amount of nozzles to print a respective portion of an image or rows of dots in the direction in which the printhead is conveyed. See *Girones*, Col 26, Rows 31-37**).

Regarding Claim 6, ***Maruyama*** discloses wherein at least one element in the group is serviced prior to printing so that it is at least partially operational at the commencement of the print job, printing being commenced using the said at least one serviced element and one non-serviced element (**Col 6, Rows 1-20, preparing the nozzles identified for printing in a first pass for printing while nozzles identified for printing in a second pass is not service yet**).

Masuyama does not teach wherein the non-serviced element initially is made available for use less frequently than the said at least one serviced element.

Fuse discloses a method for preparing a non-serviced printhead for printing (**Abstract, a preparatory head drive method**) wherein prior to any printing, the non-

serviced printhead is serviced **(Col 21, Row 4 – Col 22, Row 67, service routine involves driving nozzles to reject ink on the basis of print data received, see Col 15, Rows 1-8. See for example Col 15, Rows 1-65, nozzle drive mode 1)** wherein the non-serviced element initially is made available for use less frequently than the said at least one serviced element (**Col 15, Rows 60-64 and Col 12, Rows 20-38. A fully serviced nozzle would be driven at a normal drive frequency wherein a non-service nozzle initially made available for printing at a drive frequency that is less than the normal drive frequency until the printhead is fully warmed up to a preset temperature, see Col 23, Rows 1-10. Still further, a preparatory head drive frequency is applied to nozzles being made available for printing that does not eject ink but nonetheless raise its temperature, See Col 15, Rows 14-30**).

Masuyama as modified by ***Fuse*** would modify the two passing printing technique as disclosed in Fig 4 to drive serviced nozzles that has been in use at a normal printhead drive frequency and to drive non-serviced that is made newly available at a drive frequency that is less than the normal printhead drive frequency in order to ensure the non-serviced nozzle reaches the proper temperature as taught by equation 2 of ***Fuse*** **(Col 23, Rows 1-10)** where ejection of ink would be stable as.

Regarding Claim 7, ***Maruyama*** discloses prior to commencing printing, identifying portions of the array of printing elements which will be needed at least for a first pass of the array relative to the first page of the print job, and servicing printing elements according to the array portions so identified whereby one or more printing elements outside the identified

array portions are not serviced **(Col 6, Rows 1-20, identifying a subset of nozzles for a first printing pass and perform preliminary service on said nozzles only)**.

Regarding Claim 10, ***Maruyama*** discloses wherein the printer is an inkjet printer and the dot printing elements are inkjet nozzles **(Col 4, Rows 45-65)**.

Regarding Claim 11, ***Maruyama*** discloses an incremental printer **(Figs 1-2)** comprising a plurality of printing elements grouped into redundant groups, each group being arranged to print substantially different portions of a given page of a printjob **(Col 5, Rows 10-35, multi-pass printing where different nozzles are used to print different dots)**, the incremental printer being adapted, when commencing a printjob, to control at least one redundant group of printing elements such that only a subset of the printing elements in that group are used to print **(Col 5, Rows 30-35, keeping a subset of nozzles out of use when printing is first commenced)**, the incremental printer being further arranged to subsequently increase the number of printing elements in that group which are used to print **(Fig 4, and see Col 5, Rows 58 – Col 6, Row 20)**;

the printer being further arranged, when increasing the number of printing elements in subset of that group, to cause the one or more printing elements newly included in the subset to print for a predetermined duration at a frequency lower than that of one or more printing elements previously included in the subset **(Fig 4, for example Scan Pass N+I, nozzles 1-4 had already been used 5 times when nozzles 5-7 are used only once)**.

wherein the number of elements in the group available for print is increased as a function of the number of firing pulses sent to the elements of the group **(Col 5, Rows 1-10**

in view of Col 10, Rows 25-35, see also Figs 4 and 8. A pulse P1 is applied a nozzle to eject ink from the nozzle and P2 is applied to make a nozzle available for printing. In Fig 4, nozzles with P1 applied are marked with "o" and nozzles with P2 applied are marked with "x". As one can observed from Fig 4, the number of elements in the printhead available for printing increases from pass N-3 to N+5 as more and more pulses P1 and P2 are applied to respective Nozzles 1-16. For example, in N-3, only four nozzles 1-4 are available since only four P1 pulses are applied. But in pass N+5, nozzles 1-16 are available for printing since 16 P1 pulses are applied. This reads on the claimed limitation).

Maruyama does not teach wherein each element newly made available to the group is use less frequently than the existing elements in a subsequent pass of printing.

Fuse discloses a method for preparing a printhead for printing (**Abstract, a preparatory head drive method**) wherein each element in a printhead newly made available for printing is use less frequently or in a drive frequency lower or less than a normal print head drive frequency in subsequent pass of printing (**Col 12, Rows 20-38**).

Fuse suggests a method for preparing nozzles initially left unused for a period of time for normal printing conditions (**Col 3, Rows 22-28**), therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to modify the printhead of ***Maruyama*** to use element or nozzle newly made available to the group less frequently, or to set head drive frequency of elements newly made available to be lower than the normal print head drive frequency of existing elements whereas the motivation would've been to prepare

printhead for printing with reduced ink and preparation time consumption (***Fuse*, Col 3, Rows 20-40**).

Regarding Claim 12, ***Maruyama*** discloses wherein each redundant group is arranged to print a row or column of image data **(Col 5, Rows 15-35, multi-pass printing assigns a fraction of the total amount of nozzles to print a respective portion of an image or rows of dots in the direction in which the printhead is conveyed. See *Girones*, Col 26, Rows 31-37**).

Regarding Claim 16, ***Maruyama*** discloses wherein at least one element in that group is serviced prior to commencing the printjob **(Col 6, Rows 1-20, preparing the nozzles identified for printing in a first pass for printing while nozzles identified for printing in a second pass is not service yet)**.

Regarding Claim 18, ***Maruyama*** discloses wherein the printer is an inkjet printer and the printing elements are inkjet nozzles **(Col 4, Rows 45-65)**.

Regarding Claims 19-20, ***Maruyama*** does not expressly disclose a control circuit or a control program although it should be inherent that it does in order to execute all the process as disclosed.

Fuse discloses a printer control circuit adapted to control a printer to perform the method of inkjet printing and a computer readable medium containing program instruction which, when executed by a data processing device, control a printer to perform the method of inkjet printing **(Col 5, Row 55 – Col 6, Row 8, CPU 3 implementing a program stored in ROM 6)**.

Fuse discloses a method for printing that is very similar to ***Maruyama*** (***Fuse*, Col 16, Rows 20-35, nozzle drive mode 2**). Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to modify ***Maruyama***'s printer with the control system of ***Fuse*** in order to ensure smooth control of inkjet printing.

7. Claims 9 and 17 are rejected under 35 USC 103(a) as being unpatentable over the combined teachings of ***Maruyama et al. (US 6871934 B2)*** and ***Girones et al. (US 6238112 B1)*** in view of ***Audi et al. (US 6705697 B2)***.

Regarding Claims 9 and 17, the combined teachings do not disclose wherein the array of printing elements extends substantially fully across the page in the first direction.

Audi discloses incremental printer **(Fig 7)** comprising a plurality of printing elements grouped into redundant groups **(Col 3, Rows 52-65)**, each group being arranged to print substantially different portions of a given page of a printjob **(Col 4, Row 60 – Col 5, Row 5)**, the incremental printer being adapted, when commencing a printjob, to control at least one redundant group of printing elements such that only a subset of the printing elements in that group are used to print **(Col 5, Rows 30-35, keeping a subset of nozzles out of use when printing is first commenced)**, the incremental printer being further arranged to subsequently increase the number of printing elements in that group which are used to print **(Col 7, Rows 25-40, offset or incremental printing; assign a first subset of nozzles to print a different scanline relative to a second subset of nozzles, see Col 6, Rows 34-38)**;

wherein the plurality of printing elements form a page wide or a page high array or the array of printing elements extends substantially fully across the page in the first direction (**Col 3, Rows 60-65, page width nozzle array**).

It would've been obvious to one of ordinary skill in the art at the time of the invention to modify the structure of the combined teachings with the page width nozzle array configuration of ***Audi*** whereas the motivation would've been to provide "a page width printer controller that is operable to achieve collinear page width printing for use with a continuously moving recording medium that avoids at least some of the cost associated with reconfiguration of" printing raster data (***Audi*, Col 2, Rows 43-47**).

8. Claim 8 is rejected under 35 USC 103(a) as being unpatentable over the combined teachings of ***Maruyama et al. (US 6871934 B2)*** and ***Fuse. (US 5673071 A)*** in view of ***Girones et al. (US 6238112 B1)***.

The combined teachings do not disclose wherein faulty printing elements, as identified by a faulty printing element database, are excluded from being made available to the group.

Girones discloses a printer with at least one printhead comprising a plurality of nozzles (**Col 9, Rows 18-34**) with redundancy (**Col 26, Rows 31-37**) having a method of printing comprising:

performing a plurality of drop tests throughout the course of printing a single plot to determine the latest health status of the plurality of nozzles (**Col 16, Rows 20-54 and see Col 17-18, various scores and indicia indicating the health status of nozzles**);

determine, on the basis of the latest health status of the plurality of nozzles, a probability that each nozzle would work through out the course of printing (**Fig 3 and see Col 25, Rows 5-45, the value of probability changes through out the course of printing after each drop detecting test, Col 25, Rows 40-44**) ;

wherein the process of printing comprising:

commence printing with a group or subset of nozzles initially (**Col 26, Rows 30-37**);

continue printing with a subsequent subset of nozzles made newly available to the group for use in a subsequent pass of the printing (**Col 26, Rows 38-52**);

throughout said process of printing, design and otherwise update a printmask that sets the frequency of fire for each nozzle within the group on the basis of the health status of the nozzles employed in the printing process (**Col 26, Rows 53-60 and Rows 65-67**) after each drop test (**Col 24, Rows 5-15, the process of "error hiding"**);

wherein if it is determined that any element or nozzle made newly available for subsequent pass of printing has a lower probability of working than nozzles within the current group, it is initially set to a frequency of firing that is lower than the frequency of firing of nozzles with higher probabilities of working (**Col 27, Table 7, initial printmask, Col 28, Table 9, updated printmask, and see Col 27-28, the process for designing a updated printmask, the lower frequency of firing being zero. That is, the examiner understands the act of firing an inkjet inherently implies a predetermined inkjet firing frequency that is not zero wherein restricting an inkjet from firing by a printmask implies a firing frequency of zero because zero ink was jetted during said pass**).

wherein faulty printing elements, as identified by a faulty printing element database, are excluded from being made available to the group **(Fig 11, Step 1130 and see Col 19, Rows 22-30 and see Col 17, Rows 40-45, nozzles identified as permanent defect are excluded from being service and hence from ever being assign a frequency of firing ink in any subsequent modification of printmask)**.

It would've been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of the combined teachings with the hardwares and softwares to implement the drop detection test, nozzle health status determination, work probability calculations, and printmask designing as taught by ***Girones*** so as to adaptively assign workload and frequency of firing to nozzles newly introduced in a subsequent pass of printing on the basis of its latest health status whereas the motivation would've been to provide a printer with error hiding capability that ensures minimum acceptable printing quality in the event that any printhead nozzle is determined to be in a state of failure or with a high probability of failure (***Girones*, Col 24, Rows 1-14**).

Conclusion

9. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Richard Z. Zhu whose telephone number is 571-270-1587 or examiner's supervisor King Y. Poon whose telephone number is 571-272-7440. Examiner Richard Zhu can normally be reached on Monday through Thursday, 6:30 - 5:00.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RZ^2
01/06/2008

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